Re-engineering the Photochemical Assessment Monitoring Stations Program

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Outline

- Background
- Need for Re-engineering
- Objectives
- Network Design
- VOC Measurements
- Nitrogen Measurements
- Meteorological Measurements

Background

- Enhanced ozone monitoring required by Clean Air Act
  - Section 182(c)(1) of the 1990 Clean Air Act Amendments (CAAA) required the EPA to promulgate rules for enhanced monitoring to obtain more comprehensive and representative data on ozone air pollution.
  - Section 185(b) of the CAA required EPA to work with the National Academy of Sciences (NAS) to conduct a study on the role of ozone precursors in tropospheric ozone formation and control.
- On February 12, 1993, the EPA promulgated the first PAMS requirements.
- In 2006, the PAMS requirements were revised to lower the minimum requirements for PAMS.

Need for Re-Engineering

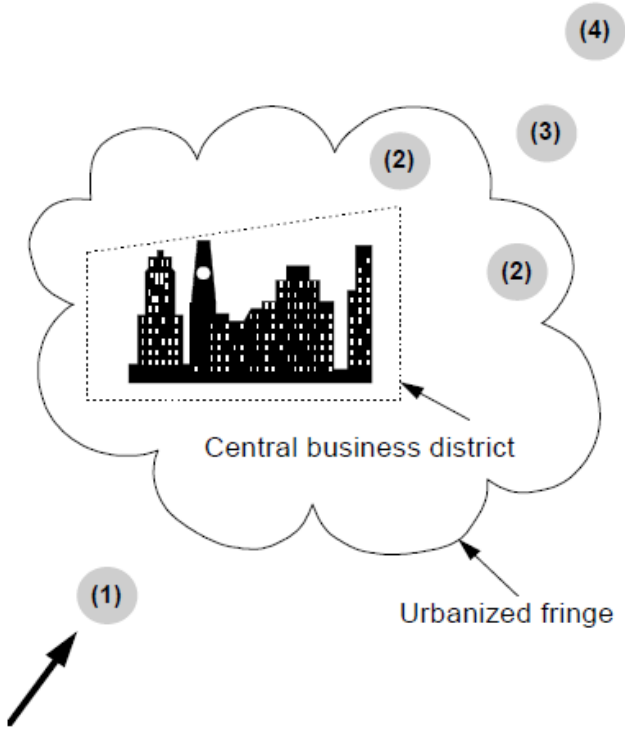
- Changes have occurred since PAMS program first started
  - Ozone standard has been revised to a level of 0.075 ppm based on 3-year average of the annual 4th highest 8-hour average
  - Ozone concentrations have decreased in many areas of the country
- Equipment is old and in need of replacement
  - New technologies available that should be considered
- Concerns about data not being used enough
  - Improvements may make data more useful

Re-examine Objectives

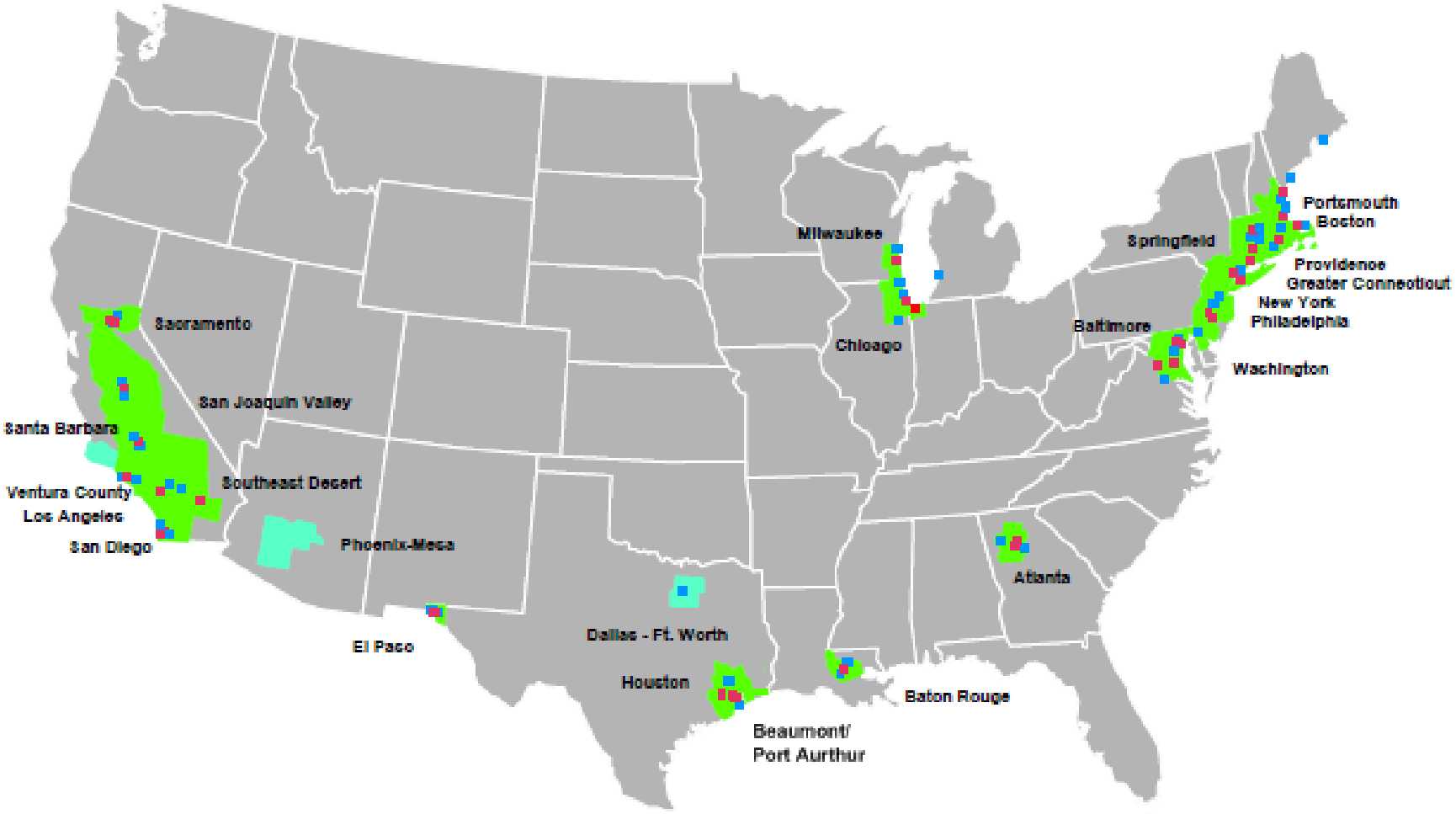
- Need to start with a re-examination of the objectives
  - Build database of speciated VOCs for evaluation of control strategies and local modeling efforts
  - Provide data for model evaluation
  - Support emission inventory improvements
  - Track trends and progress

Network Design

- Current design calls for up to 5 sites in each PAMS area
  - Type 1 Upwind
  - Type 2 Max emissions
  - Type 3 Max ozone
  - Type 4 Extreme Downwind
- PAMS Season June-August



Map of PAMS Areas



Issues with Current Network Design

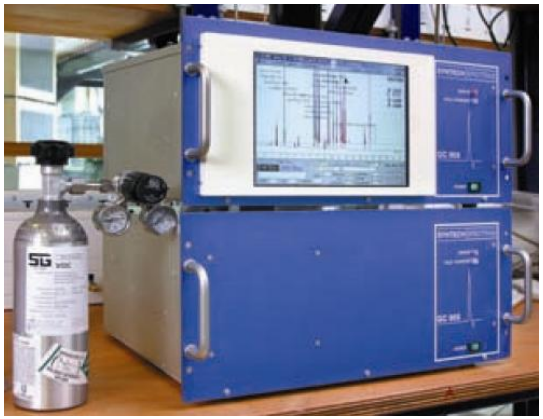
- Poor spatial coverage
  - PAMS areas mostly in coastal areas
  - Limits value to model development/testing
- PAMS season is limited to summer months
  - Doesn’t provide for extremes in variables
- Options under consideration
  - Add PAMS measurements to urban NCore
  - Lengthen the PAMS season
  - Mobile sites

PAMS Target List

- PAMS measures 58 “target” VOCs
  - Consider adding compounds
    - Biogenics
    - Air toxics
  - Consider dropping compounds
    - Low concentrations/Non-detects

VOC Measurement Technologies

Canisters vs Auto-GCs

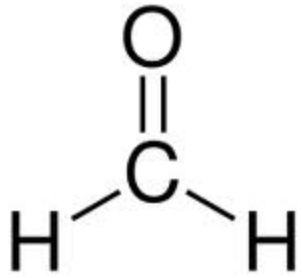


- Data averaged over sampling period
- Low capital cost
- Continuing lab costs
- Manually intensive

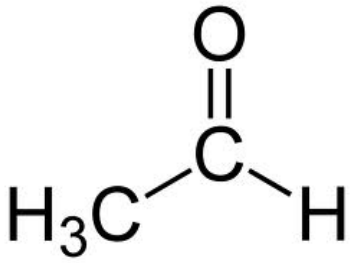
- Hourly data
- Higher capital cost
- Higher skill level required to run and analyze data

Carbonyls

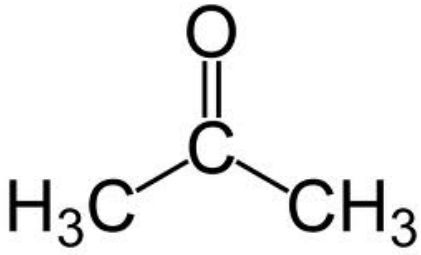
- Carbonyl sampling was removed from the PAMS requirements in all areas except those in severe and above non-attainment areas due to concerns about data quality
- Carbonyl data is important to ozone model evaluation
- Important air toxics
- We will be evaluating sampling and analysis method to determine if carbonyl sampling methods have been/can be improved



Formaldehyde



Acetaldehyde



Acetone

Nitrogen Measurements

- NO2 plays a major role in ozone formation
- Standard NOx measurement technology is known to have positive interferences from other non-NOx species (HNO3, PAN, mPAN, etc.)
  - NO2 measurement = NOwhat
- NOy measurements don't give a NO2 reading at all!
- New technologies are coming out that will provide a better NO2 measurement
  - Direct NO2 measurements
  - "true NO2" photolytic converters
- Can we get NO/true NO2/NOy all in one box?

Upper Air Meteorology Measurements

- Current requirements state that one representative upper air site is required in each PAMS area
  - Details on what upper air data is to be collected is not defined!
    - Mixing height
    - Wind direction and speed?
- Most upper air systems used in PAMS are radar profilers with RASS temperature profilers
  - The systems at PAMS sites are old and VERY expensive
- Inexpensive ceilometers can provide continuous mixing height data
- Can NOAA profilers meet PAMS data needs?

Questions?